CLAIMS

We claim:

1. A method of making pentafluorosulfanyl substituted compounds comprising the steps of:

a) contacting a hexane solution comprising one or more compounds comprising one or more functional groups selected from the group consisting of substituted or unsubstituted aliphatic groups, substituted or unsubstituted aromatic groups, substituted or unsubstituted alicyclic groups, substituted or unsubstituted alkene groups, substituted or unsubstituted alkyne groups, substituted or unsubstituted styrene groups, disubstituted alkene groups (*e.g.*, 2,2-disubstituted alkenes), substituted or unsubstituted non-terminal alkene groups, substituted or unsubstituted non-terminal alkyne groups, cyclohexene groups, substituted cyclohexene groups, cyclohexadiene groups, substituted cyclohexadiene groups, and combinations of such functional groups, or derivatives of the aforementioned functional groups, with a SF_5Cl hexane solution;

b) adding one or more catalyst(s)/initiator(s) selected from the group consisting of dialkylboranes, trialkylboranes, 9-borabicyclo[3.3.1] nonane, and mixtures thereof; and

c) allowing the reaction of said compounds and said SF_5CL solution to proceed under conditions suitable for the addition of pentafluorosulfanyl substituents to said compounds.

2. The method according to claim 1, wherein the reaction is allowed to proceed to completion.

3. The method according to claim 1, further comprising an elimination or oxidation step.

4. The method according to claim 1, further comprising a hydrolysis step.

5. The method according to claim 4, further comprising a drying step.

6. The method according to claim 5, wherein said drying step is performed over a dessicant.

7. The method according to claim 1, further comprising a purification step.

8. The method according to claim 2, further comprising a purification step.

9. The method according to claim 3, further comprising a purification step.

10. The method according to claim 4, further comprising a purification step.

11. The method according to claim 5, further comprising a purification step.

12. The method according to claim 1, wherein the catalyst(s)/initiator(s) are added to: 1) a hexane solution containing SF_5Cl; or 2) a hexane solution containing one or more compounds prior to the combination of the solution containing SF_5CL and the solution containing a compound.

13. A method of making pentafluorosulfanyl benzene comprising the steps of:

a) mixing 4,5-dichloro-1-cyclohexane, CH_2Cl_2, SF_5Cl, and a catalyst selected from the group consisting of dialkylboranes, trialkylboranes, 9-borabicyclo[3.3.1] nonane, and mixtures thereof;

b) evaporating the solvent from the mixture of step a) and recovering the product produced thereby;

c) contacting the product obtained in step b) with a solution of sodium ethoxide (NaOEt);

d) adding water to the solution of step c) and extracting said solution;

e) washing the extract of step d) and drying the extract over a dessicant;

f) allowing solvent evaporation from the extract of step e); and

g) recovering pentafluorosulfanylbenzene from the extract of step f).